

# Needs-based Assessment of Students with (suspicion of) Intellectual Giftedness and/or an Autism Spectrum Disorder: Design of a Heuristic

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## Abstract

This contribution presents the design of a theoretically grounded assessment Heuristic concerning students with (suspicion of) the coexistence of *Intellectual Giftedness and an Autism Spectrum Disorder (IG+ASD)*. This Heuristic focuses at various cognitive and psycho-social Strengths and Weaknesses (S&Ws) and is called the *S&W Heuristic*. It deals with the discrepancy between the lack of a theoretically grounded coherent view on assessment and intervention issues concerning students with (suspicion of) IG+ASD and the concomitant problem of biased diagnoses in psycho-educational practice. It aims at a systematic connection between assessment and intervention-indications, by way of systematic dimensional needs-based assessment. One of its merits is that the assessment departs from IG+ASD characteristics, instead of IG-characteristics apart from ASD-symptoms, so that camouflage and underachievement might be detected more easily. The *S&W Heuristic* is explorative in nature and serves as a point of departure in theory-development and psycho-educational praxis concerning IG+ASD and may be *Twice-Exceptionalities* in general.

**Keywords:** Needs-based assessment, Intellectual giftedness, ASD, Twice-exceptionality, Dimensional assessment

*Received: 15/10/13*

*Initial acceptance: 23/10/13*

*Final acceptance: 17/03/14*

# **Evaluación Basada en las Necesidades de Alumnos en los que se Suponen Altas Capacidades Intelectuales y/o un Trastorno del Espectro Autista: el Diseño de una Heurística**

## **Resumen**

Esta participación representa el proyecto de una *Prueba de Evaluación Heurística*, basada en teoría que se trata de estudiantes con (posibilidad de) *Intellectual Giftedness* y *un Autism Spectrum Disorder (IG+ASD)* (Dotes de superdotación intelectual y Espectro de trastorno autista). Este Heurístico enfoca en varias Fuerzas y Debilidades (S&W's) cognoscitivas y psicosociales y se menciona *Heurístico S&W*. Se trata de la discordancia entre la falta de una visión coherente fundada en teoría de la prueba de evaluación y los temas de intervención respecto a estudiantes con (posibilidad de) (IG+ASD), y el problema relativo de diagnóstico presupuesto en la práctica psicoeducativa. Se refiere a una conexión sistemática entre la prueba de evaluación e indicaciones de intervención, por una prueba de evaluación basada en necesidades dimensional. Uno de sus méritos es que la prueba parte de características IG+ASD, en vez de características IG separado de síntomas ASD, así que se detecte con mayor facilidad camuflaje y rendimiento negativo. El *Heurístico S&W* es explorable y sirve de punto de partida en desarrollo de teoría y práctica psico-educativa tratando de IG+ASD y en general puede ser *Twice-Exceptionalities* (Doble Excepcional).

**Palabras Clave:** necesidad específica de diagnóstico, superdotados, autismo, doble excepcional, diagnóstico dimensional

*Recibido:* 15/10/13

*Aceptación inicial:* 23/10/13

*Aceptación final:* 17/03/14

## Introduction

In clinical and psycho-educational practice, professionals faced the problem of biased diagnoses concerning students with (suspicion of) *Intellectual Giftedness and an Autism Spectrum Disorder (IG+ASD)*. Moreover, professionals tended to indicate interventions in a haphazard way, based on IG literature and/or ASD literature interweaved with clinical opinions and anecdotal case descriptions (see for instance Barber, 1996; Cash, 1999; Donnelly & Altman, 1994; Grandin, 1992; Henderson, 2001; Little, 2002; Neihart, 2000; Webb, Amend, Webb, Goerss, Beljan & Richard Olenchak, 2005). Up to date, there are no theoretically grounded guidelines, regarding assessments and interventions of students with (suspicion of) IG+ASD (Assouline, Foley Nicpon & Doobay, 2009; Burger-Veltmeijer, Minnaert & Van Houten-Van den Bosch, 2011; Huber, 2007). Future investigation is necessary to get answers to diagnostic and intervention questions concerning twice-exceptional<sup>1</sup> (TE) students, including gifted students with an ASD (Foley Nicpon, Allmon, Sieck and Stinson, 2011).

We faced the following question: How can clinical and psycho-educational theory and praxis, regarding assessments and intervention-indications of students with (suspicion of) IG+ASD, be tuned to each other in such a way that biased assessments can be reduced, and that a grounded interconnection between assessments and intervention-indications can be realised? We considered that the first step to the answer demanded the construction of an explorative conceptual framework, a Heuristic, which should be systematic and open to feedback and change, depending on growing clinical and psycho-educational theoretical as well as practical<sup>2</sup> insights in the future. The aim of this contribution is the construction of a prototype of a dynamic Heuristic like that. It was assembled by way of the following sub questions:

1. Which theoretical concepts regarding IG+ASD are solid enough to date, to be used in a prototype of an explorative conceptual Heuristic?
2. How can biased assessments of IG+ASD be reduced?
3. How can assessment outcomes be connected to intervention-indications?

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<sup>1</sup> Twice-exceptionality (TE) refers to giftedness with coexisting disabilities, for instance specific learning disorders, like dyslexia, or developmental disorders such as Autism Spectrum Disorders (ASD) or Attention Deficit Hyperactivity Disorder (ADHD) (e.g. Burger-Veltmeijer et al. 2011; Foley Nicpon et al., 2011a).

<sup>2</sup> Dai, Swanson and Cheng (2010) evaluated the state of research of giftedness and gifted education. They perceived a gap between theory and practice, especially .. “between psychological understanding of gifted development and promoting such development through education.” (p. 126).

The answers to these questions are the theoretical underpinnings of the Heuristic. These are described in the next three subsections. Subsequently, the Heuristic is assembled and described. Its' value, limitations and implications are discussed in the final section.

## Conceptual underpinnings

### *Theoretical concepts*

There are very few empirically grounded references to date that explicitly and profoundly dealt with theoretical conceptualisations of the phenomenon IG+ASD. Burger-Veltmeijer et al. (2011) explored the state of the art concerning the theoretical and empirical knowledge of (diagnostic issues of) IG+ASD, in publications and dissertations in peer reviewed scientific journals. These authors noticed some slight tendencies towards some clustered personal characteristics of IG+ASD (Table 1).

**Table 1. (Clustered) characteristics concerning IG+ASD (Burger-Veltmeijer et al., 2011)**

<b>Clusters</b>	<b>Characteristics</b>
<i>uneven development</i>	social vs. cognitive
	reasoning vs. motor
	VIQ vs. PIQ
	<u>IQs vs. PSI</u>
superior non-verbal capacities	math, physics, computer
	<i>creative, divergent thinking</i>
<i>social issues</i>	deficits in social adjustment/social isolation
	unawareness of social rules and interactions
<i>verbal/language issues</i>	formal, pedantic, monotonous speech with nearly absent prosody
EF issues	<i>intense (obsessive) focus (for details)/perfectionism</i>
<i>memory issues</i>	excellent (rote) memory for factual info
<i>hypersensitivity</i>	<i>general hypersensitivity</i>

Similar traits of IG and ASD printed italic. Added characteristic (Assouline et al., 2009; Doobay, 2010; Foley Nicpon et al., 2011b) printed underscored

Abbreviations of Tables 1-3: ASD=Autism Spectrum Disorder; CC=Central Coherence; EF=Executive Function; FSIQ=Full Scale IQ; IG=Intellectual Giftedness; IG+ASD=the co-occurrence of IG and ASD; PIQ=Performance IQ; PSI=Processing Speed Index; S=Strength; S&W=Strengths and Weaknesses; SPENs=Special Psycho-Educational Needs; VIQ=Verbal IQ; vs=versus; W=Weakness.

These clusters were derived from a systematic comparison of publications with varying methodologies that implicitly or explicitly exposed some theorisations and/or data concerning individuals with IG+ASD. Burger-Veltmeijer et al. (2011) suggested to use these characteristics as a point of departure in theoretical conceptualisations and practical use, for instance via educational design research<sup>3</sup>. In addition to the aforementioned literature review, some recent empirical (case) studies showed the following psychosocial and cognitive characteristics of students with IG+ASD: Fewer self-reported problems on psychosocial measures, lesser affect recognition and weaker attention and memory issues (Assouline et al., 2009, n=2 case study, 1 IG control); relative weakness of Processing Speed Index (PSI) at Wechsler scales as compared to Cognitive Reasoning (Assouline et al., 2009; Doobay, 2010; Foley Nicpon et al., 2011b); lesser adaptive and psychosocial/behavioural functioning and social skills than IG students (Doobay, 2010, n=91 case study, 40 IG controls); relative weakness of working memory as compared to Cognitive Reasoning (Foley Nicpon, 2011b). The problem is that these empirical studies were hardly embedded in a theoretical framework. Besides, we sensed a tendency of circularity in the inclusion criteria. That is, inclusion of IG+ASD participants was based on comprehensive assessments, and subsequently, based on the results, the authors suggested to use comprehensive assessment in order to identify ASDs among IG students. Moreover, ASD controls were absent, and Foley Nicpon et al (2011b) had no controls at all. The absence of ASD controls makes it unclear whether or not these characteristics might be common to all students with an ASD. Nevertheless, these recent empirical studies help to make an onset of an empirical foundation of the theoretical conceptualisation of IG+ASD, especially the characteristic ‘relative weakness in Processing Speed Index’ (PSI), which was mentioned in all three aforementioned publications (Assouline et al., 2009; Doobay, 2010; Foley Nicpon et al., 2011b). We added this characteristic to the cluster ‘uneven development’ (Table 1).

We assumed that the characteristics mentioned in Table 1 are solid enough to serve as the basic theoretical concepts of our Heuristic, with the restriction that they are nothing more than an explorative point of departure in the process of ongoing conceptual refinement and progressing practical experience concerning students with (suspicion of) IG+ASD. Burger-

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<sup>3</sup> Educational design research can be characterised as an iterative cyclic and process oriented approach of developmental research in which the developed design is explorative in nature and (at least partly) based upon theoretical propositions. It is utility oriented and aimed at designing an intervention in the real world (Van den Akker, Gravemeijer, McKenney & Nieveen, 2006). It should always have the dual goals of refining both theory and practice (Collins, Joseph & Bielaczyc, 2004).

Veltmeijer et al. (2011) defined the concept IG+ASD as an ASD diagnosis<sup>4</sup> with or without co-morbidity, in co-occurrence with cognitive intelligence and/or academic performances at a gifted, talented, supreme or very high ability level. In this publication, we used this conceptual definition to ground the Heuristic design. In the final section of this contribution, a limited operational definition is recommended for future research.

### *Reduction of biased assessment*

According to gifted literature on IG+ASD (e.g. Burger-Veltmeijer, 2006a, 2008; Cash, 1999; Gallagher & Gallagher, 2002; Neihart, 2000; Webb et al., 2005), biased identifications of students with (suspicion of) IG+ASD, resulting in mislabelling, missed labelling or one-sided labelling, might be due to various interdependent causes, such as: similar behavioural characteristics of IG and of ASDs, the one-sided training and experience of professionals in either giftedness or ASDs and the mutual camouflaging effect of IG- and ASD characteristics. This ‘camouflaging effect’ implies that weaknesses and strengths of TE-students in general and IG+ASD students in particular might interfere in complex ways (Gallagher & Gallagher, 2002). A gifted trait like extensive verbal knowledge base, for example, might either obscure or reinforce ASD-traits such as impaired reciprocal social communication. The camouflaging effect was not empirically validated yet (Burger-Veltmeijer et al., 2011; Foley Nicpon et al., 2011a) since camouflage is hard to detect by definition. Nevertheless, this phenomenon was noticed among practitioners and in various publications on TE (e.g. Gallagher & Gallagher, 2002; Moon, 2002; Neihart, 2000; Reis & Renzulli, 2004). Burger-Veltmeijer et al. (2011) found that in most publications on IG+ASD, diagnostic recommendations were scarce and merely classification based, that is focused at the categorical labels IG, ASD, or IG+ASD. In psychopathology, categorical diagnoses have only two values, that is the absence or presence of a disorder (Dayle Jones, 2012, p 481), and refer to a qualitative distinction between normality and pathology (e.g.; Hengeveld, 2009, p 61; Widiger & Samuel, 2005, p. 494). Since giftedness is not a disease, we define classification as the qualitative distinction between normality and deviation. In case of IG+ASD, classification might be difficult since many students with (suspicion of) IG+ASD might not fit the usual diagnostic templates of IG or ASDs because of the aforementioned similar characteristics and camouflaging effect. These students

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<sup>4</sup> Including either Autism (AU), Asperger’s Disorder (AD), High Functioning Autism (HFA) or Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS).

cannot be classified into discrete entities, but are situated in a grey zone between IG with or without an ASD (Burger-Veltmeijer 2003, 2006a, 2006b, 2007, 2008). Therefore, we assume that the traditional classification directed assessment might increase biased labelling. Another and more contemporary view on psychopathology is the dimensional one that states that disorders, including ASDs, are selections of dimensional traits along a continuum with a range of severity and a rather arbitrary based agreement on particular quantitative ‘cut off’ scores between ‘normality’ and ‘deviation’ (e.g. Baron Cohen, 2000; Rapin, 2002; Vermeulen, 2002; Volkmar, Lord, Bailey, Schultz, Klin, 2004). In normal distributions, for example, a rather arbitrarily chosen discrepancy of 2sd’s between various dimensions of personal traits might indicate intra-individual differences. This was applied in dimensional models (Burger-Veltmeijer, 2006b, 2007, 2008; Lawson, Baron-Cohen & Wheelwright, 2004). In short, classification based assessments are focused on qualitative ‘cut offs’ between ‘label’ or ‘no label’, and therefore are aimed at ‘Yes/No questions’. Whereas dimensionally based assessments are focused at intra-individual quantitative variation across various neurocognitive and psychosocial traits, in order to acquire a within-person profile of Strengths and Weaknesses (S&Ws)<sup>5</sup>.

Since TE students in general and IG+ASD students in particular are characterized by very discrepant S&Ws<sup>6</sup> (e.g. Cash, 1999; Chiang & Lin, 2007; Gilger & Hind, 2008), for example spectacular gifts in math in co-occurrence with disabled social communication, we viewed that dimensional assessment pre-eminently could be of help in profiling the students capacities and thus reduce premature biased labelling. Labelling might still be necessary, however, for example to acquire educational and psychological funding and facilities. Moreover, categories and dimensions might not be as distinct as it seems because “... a category could be expressed as a set of dimensional scores, and a profile of dimensional scores could be a category” (Taylor and Rutter, 2002, p 5). The quality of assessments might benefit from

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<sup>5</sup> (Neuro)cognitive traits or dimensions are for example various aspects of perception, memory, attention, executive functions, and intellectual and academic abilities. Psychosocial dimensions are for example aspects of reciprocal social communication, like eye contact, facial expressions or body language or aspects of emotion regulation and adaptive behavior et cetera. Each person has his own specific profile of S&Ws across and within the various dimensions.

<sup>6</sup> TE is a rather new phenomenon in gifted literature and little is known about the physiological origins (Kalbfleisch & Iguchi, 2008). Gilger & Hynd (2008) proposed to view the brain as an integrated organ that might cause Ss and Ws in a dependant way. This was in line with the ideas of Geschwind and Galaburda (1985) who suggested that if growth of one brain area was delayed, other regions would be larger than they normally would have been. In this manner, even remarkable talents might develop like those of some autistic persons.

an integrative use of dimensional and categorical models (Dayle Jones, 2012; Grietens, 2008; Widiger & Samuel, 2005).

Based on the aforementioned, and on our clinical and psycho-educational experience, we assumed that the reduction of biased assessment of students with (suspicion of) IG+ASD might benefit from an integration of categorical and dimensional assessments, that is primarily focused at the dimensional identification of S&W profiles and might secondarily, if still necessary, be focused at the identification of the labels IG, an ASD, or IG+ASD. This is opposite to common clinical and psycho-educational practice, in which the label precedes and determines the intervention-indications. Moreover, it is opposite to DSM-5 related dimensional assessments, in which the categorical diagnosis precedes the dimensional severity level (APA, 2013; Dayle Jones, 2012; Widiger & Samuel, 2005)<sup>7</sup>.

#### *Towards intervention-indications*

TE-students with multiple cognitive S&Ws require not only assessments but also interventions that focus on both the individual Weaknesses (Ws) and the Strengths (Ss) (Foley Nicpon et al, 2011a; Gilger & Hynd, 2008). Correct identification of a student's S&Ws gives opportunity to an appropriate individual educational plan (Neihart, 2000). As elaborated before, dimensional assessment might result in S&W profiles. As such, dimensional assessment, contrary to categorical labelling, has the opportunity to offer individually tuned intervention-indications. We viewed that the connection between assessment outcomes, that is individual S&Ws, and intervention-indications could only be made if the S&Ws were *translated* into the psycho-educational *needs* of individual students with (suspicion of) IG+ASD. This is the intention of *Needs Based Assessment* (NBA) procedures, that aim not primarily at diagnostic labelling, but rather at recommendations for educational or psychological interventions in order to address a student's Special Psycho-Educational Needs (SPEN). 'Special' does not necessarily refer to 'special education', but broadly refers to 'individually' tuned provisions in the regular curriculum or elsewhere. According to Pameijer (2006), NBA targets relevant risks as well as protective factors, like S&Ws, concerning the individual students as well as the educational and home environment. In short, NBA looks for the 'goodness of fit' between

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<sup>7</sup> The new Diagnostic and Statistical Manual of Mental Disorders, the DSM-5 (APA, 2013), is more directed at the integration of dimensionality with categorisation than the DSM-IV-TR (APA, 2000), by way of severity levels per class. Moreover, the DSM 5 contains the classification 'Autism Spectrum Disorder' apart from a new class called 'Social Communication Disorder'.

the child's needs and the environmental provisions. A combination of NBA and dimensional assessment was utilised by Burger-Veltmeijer (2006b, 2007, 2008) in the idea of the Dimensional Discrepancy Checklist (DD-Checklist), that was meant to enable educational psychologists to differentiate between IG-like versus IG+ASD-like manifestations of some similar behavioural characteristics of giftedness and ASD, in order to facilitate appropriate needs-based advices. The core idea of this DD-Checklist was the direct connection between assessment and intervention-indications, within a few dimensional personal traits, that partly overlap some of the characteristics as found by Burger-Veltmeijer et al. (2011, see Table 1).

A combination of NBA with dimensional assessment, that *translates* S&Ws into psycho-educational *needs*, might offer a grounded solution to the question how assessments of students with (suspicion of) IG+ASD could be connected to intervention-indications.

### **The S&W Heuristic**

Based on the theory elaborated in the previous three subsections, the conceptual underpinnings of the *S&W Heuristic* can be summarized as follows:

1. The personal traits in Table 1 could be used as basic theoretical concepts of IG+ASD.
2. Reduction of biased assessment should be strived by way of an integration of categorical and dimensional assessment that is primarily aimed at the identification of individual S&W profiles en might secondarily be aimed at classification.
3. The connection between assessment outcomes and intervention-indications could be made by way of dimensional assessment that is aimed at needs-based intervention-indications, via the identification of individual S&W profiles and subsequent *translation* into SPENs.

The aforementioned personal traits could serve as the dimensions in question.

This section offers a description of the assemblage of these underpinnings into a conceptual framework, called the *S&W Heuristic*. The next four subsections describe the assemblage by means of Figure 1, Table 2 and Table 3. Practical directions are noted in the final subsection.

**Table 2: Design of S&W profile**

<b>(Clustered) Characteristics</b> <i>(Burger-Veltmeijer et al., 2011)</i>		<b>Strengths &amp; Weaknesses (S&amp;W) profile</b>						<b>T R A N S L A T I O N</b>	<b>Needs-based info</b>				
<b>Clus- ters</b>	<b>Characteristics</b>	<b>Instruments used</b>	<b>S ++</b>  ( very) high capacity (+ 2sd)	<b>S +</b>  above average capacity (+ 1sd)	<b>S/W +/-</b>  average capacity, none to mild im- pairment	<b>W -</b>  moderate impair- ment (- 1 sd)	<b>W --</b>  (very) severe impairment (- 2 sd)		<b>SPENs</b>	<b>Actual provi- sions</b>	<b>Goodness of fit?</b>	<b>Intervention- indications</b>	
<i>uneven de- velop- ment</i>	cognitive vs. social and motor;	FSIQ											
		VIQ											
	VIQ vs. PIQ vs. PSI and other indexes, motor factors	PIQ											
		Index IQs, factor IQs											
		PSI											
		social see below											
		motor											
Acade- mic achieve ment	subject x												
	subject y (etc)												
superior nonver- bal ca- pacities	math, physics, computer												
	<i>creative, divergent non- verbal thinking</i>												

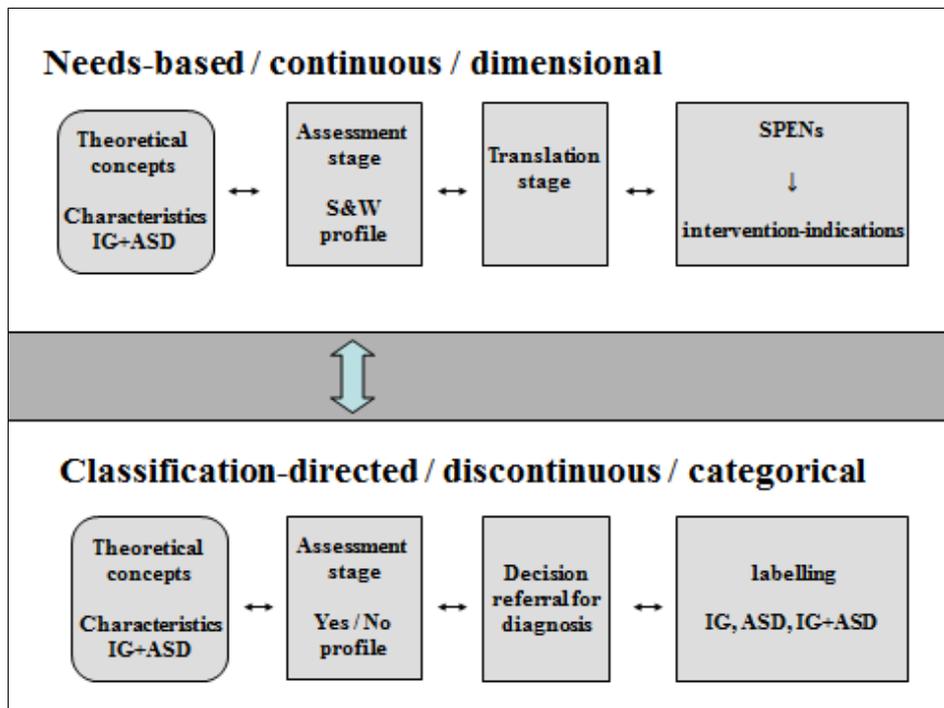
		<b>Differential S&amp;W profile</b>									
<b>Similar (clustered) characteristics</b> <i>(Burger-Veltmeijer et al., 2011)</i>		<b>IG manifestation</b> <i>(Burger-Veltmeijer, 2006, 2008)</i>					<b>ASD manifestation</b> <i>(Burger-Veltmeijer, 2006, 2008)</i>				
<i>social issues</i>	social adjustment				social isolation due to shortage of 'interest peers' or lack of tolerance for slow learners; and: independent of age - mates, but knows how to make friends	deficits in social adjustment, social isolation due to shortage of 'interest peers' and/or intolerance; and: unskilled with age mates, slightly aware of how to make friends	deficits in social adjustment, social isolation due to lack of Theory of Mind, socially inept; lack of empathy; and: unskilled with Age Mates, unaware how to make friends				
	awareness of social rules and interactions				know they are different, can reason why; aware of another's perspective and viewpoint		know they are different, poor awareness of why; unaware of another's perspective and viewpoint				
<i>Verbal-language issues</i>	precocious language development,										
	verbal fluency (Neihart, 2000)										
	Originality versus echolalia		original, creative speech, normal, may have language of older child				delayed echolalia, formal, monotonous, repetitive, pedantic speech, with nearly absent prosody				
EF issues	EF development: aspects or in general										
	<i>intense (obsessive) focus (for details), perfectionism</i>		interested in many things, passionate fascination, can be distracted from it				a rigid fascination (Cash, 1999) with one topic of interest, cannot shift attention to other things				
<i>memory issues and central coherence (CC)</i>	CC development: aspects or in general										
	excellent (rote) memory for factual info		advanced understanding, holistic meaningful learning; more selective, filter out, discard certain sources of information				advanced memorization, fragmented learning, preoccupation with details; enjoys 'rote' exercises, (obsessively) memorize everything				
<i>hypersensitivity</i>	<i>general hypersensitivity</i>										

Table 3: Yes/No profile

<b>Clusters</b> <i>(Burger-Veltmeijer et al., 2011)</i>	<b>Characteristics IG+ASD</b> <i>(Burger-Veltmeijer et al., 2011)</i>	<b>Check S&amp;W profile (Table 2) to answer these questions</b>	<b>Yes / No</b>	<b>Decision: is referral for diagnosis necessary?</b>
<i>uneven development?</i>	social vs. cognitive	superior cognitive vs. social development?		
	reasoning vs. motor	Superior cognitive vs. motor development?		
	VIQ vs. PIQ	uneven development VIQ vs. PIQ?		
	index scores or factor IQs	discrepancies between factor IQs or between index scores?		
	PSI	PSI lower than IQs or index scores?		
academic achievement	levels of scholastic subjects	discrepancy in levels?		
superior non-verbal capacities?	math, physics, computer	superior in mathematics, physics and/or computer?		
	<i>creative, divergent nonverbal thinking</i>	superior in creative, divergent nonverbal thinking?		
	<b>Characteristics of IG+ASD, and of ASD</b>	<b>Check differential S&amp;W profile (Table 2) to decide whether ASD manifestation is in effect (column W--)</b>		
<i>social issues</i>	deficits in social adjustment/social isolation	deficits in social adjustment?		
		social isolation?		
	unawareness of social rules and interactions	unaware of social rules?		
		unaware of social interactions?		
<i>verbal/language issues</i>	precociousness, but formal, pedantic, monotonous speech with nearly absent prosody	formal, pedantic, monotonous speech with nearly absent prosody?		
EF issues	EF development, aspects or in general	impairments in EF development?		
	<i>intense (obsessive) focus (for details)/perfectionism</i>	intense (obsessive) focus (for details) and perfectionism?		
<i>memory issues and CC development</i>	CC development, aspects or in general	impairments in CC development?		
	excellent (rote) memory for factual info	excellent (rote) memory for factual info?		
<i>hypersensitivity</i>	<i>general hypersensitivity</i>	<i>general hypersensitivity?</i>		

*The S&W Heuristic, an overview*

The *S&W Heuristic* is visualised in Figure 1 by means of two white horizontal rectangles. The upper rectangle illustrates a NBA procedure, based on the dimensional viewpoint. The theoretical concepts, that is, the personal traits of Table 1 are the basic dimensions. In individual assessments, the level of functioning can be identified per dimensional trait. All together, these dimensional levels create the S&W profile of an individual student with (suspicion of) IG+ASD. *Per dimension*, the S&Ws should be *translated* into Special Psycho-Educational Needs (SPENs). The integration of all SPENs, including possible contradictory ones, may help to create the eventual intervention-indications. The lower rectangle in Figure 1 illustrates a classification-directed procedure, based on the categorical view. Here, the assessment is aimed at a Yes/No profile that might support the decision whether or not referral for categorical diagnosis (such as IG, ASD, IG+ASD) is needed for this student. The Yes/No profile departs from the same basic theoretical concepts as the S&W profile, as will be elaborated further. Within both rectangles in Figure 1, the horizontal two-sided arrows illustrate the empirical input-feedback process, that should enable researchers to study and refine the *theoretical* underpinnings among groups of students with (suspicion of) IG+ASD. Analogously, professionals in psycho-educational *practice* could evaluate and readjust the several stages in case of individual assessment procedures. The large vertical arrow in the middle of Figure 1 aims at the aforementioned integration of both procedures.



**Figure 1. The S&W Model**

### *Dimensional assessment*

Table 2 is the central framework of the entire *S&W Heuristic*. It contains an elaboration of the dimensional NBA procedure, and corresponds with the upper rectangle of Figure 1. In the middle of Table 2, the grey-coloured five columns 4-8 illustrate the core position of the S&W profile in the NBA procedure. The social and cognitive characteristics (Table 1) are represented in the first two columns in Table 2. The dimensional viewpoint is visualised by the horizontal rows. Each row represents a personal characteristic in a continuous way, with the possibility of various levels of functioning. After assessment, the levels can be ticked off per characteristic, in the grey coloured columns 4-8, varying from high Strengths (column 4) to severe Weaknesses (column 8). Subsequently, the S&W profile can be drawn. The S&W profile in the upper part of Table 2 is mainly based on the first two clusters in Table 1, namely ‘uneven development’ and ‘superior non-verbal capacities’. The S&W profile in the lower part of Table 2 is based on the last five clusters in Table 1. It is called the *differential S&W profile*, because it is not only aimed at a S&W analysis, but might also serve the goal of differentiating between IG manifestations and ASD manifestations. This is because this lower part contains some (clusters of) characteristics that were specified by Burger-Veltmeijer et al. (2011) as similar traits between IG and ASD, the italic printed *similarities* in Tables 1, 2 and 3. The IG-manifestation corresponds with the area of high strengths (+2sd) in column 4 whereas the ASD-manifestation corresponds with the area of severe Weaknesses (-2sd) in column 8. The *similarities* are more or less similar to the characteristics of the *DD-Checklist* of Burger-Veltmeijer (2006b, 2007, 2008). Therefore, the lower part of Table 2 shows a partial overlap with this *DD-Checklist*. The texts in the cells of the differential S&W zone are based on, but not entirely similar to, descriptions out of the *DD-Checklist*. Some necessary textual and other adjustments will be elaborated in the next subsection. Some characteristics in the upper part of Table 2 might *seem* to overlap some in the lower part, for instance in the realm of social development. In the upper part of Table 2, however, the core focus is not the level of social development per se, but its relativity to levels of cognitive development. In the lower part of Table 2, the cluster ‘social issues’ is the core focus. Since it was found to be a separate cluster from ‘uneven development’ (Burger-Veltmeijer et al., 2011), and since it might have the potential of being a qualitative differential characteristic between IG with and without ASD (Burger-Veltmeijer et al. 2011; Burger-Veltmeijer 2006b, 2007, 2008), it should stay apart from ‘uneven development’, at least for the present study. In future studies and individual assessments, however, the use of ‘social’ instruments for the ‘upper’ and ‘lower’ part of Table 2 could be integrated, as long as conceptual distinctions of ‘developmental uneven-

ness' and 'differential possibility' are made. For instance, the qualitative and quantitative outcomes of instruments used for social skills (as will be clarified in the subsection 'Practical procedural directions') could be used to tick of an overall level of social development in the cluster 'uneven development'. Meantime, these outcomes could be used to tick of the characteristics 'social adjustment' and 'awareness of social rules and interactions' in the lower part of the S&W Profile. The same line of thought goes for other characteristics, like 'index IQs' (one of which might be the Working Memory Index of the intelligence test WISC-IV) in the cluster 'uneven development' at the upper part of Table 2, and the characteristics 'EF development, aspects or in general' and 'excellent (rote) memory for factual info' in the lower part of Table 2. In this way, the two parts of Table 2 should be used together to inform the S&W profile.

IG+ASD students require interventions that encourage and develop interests and strengths and meanwhile provide strategies to stretch or compensate for areas of weakness (Bianco et al., 2009; Barber, 1996; Lanou, Hough & Powell, 2012). As elaborated before, this requires an in between translation of S&Ws into SPENs. The framework of Table 2 provides for this by means of the rows that illustrate that per dimension a specific S or W could be connected to a specific SPEN. In doing so, the eventual special psycho-educational provisions can address both the Ss as well as the Ws in a rather *systematic* and *unbiased* way. S&Ws might be assessed not only by means of a comprehensive test battery, as was suggested in some publications (Assouline et al., 2009; Doobay, 2011; Foley Nicpon et al., 2010; Huber, 2007), but also by way of observations of adaptive and social behaviour in everyday situations like the school environment. This is essential, because students with normal to high intelligences might show enough social cognition in a structured testing situation, but might fail to apply these automatically in unstructured everyday situations, that are much more difficult to control by cognition (Begeer, 2005). Therefore, the (differential) S&W profile should be filled in at the end of a comprehensive assessment, including daily-life observations, that thoroughly measured multiple dimensions of cognitive, social and behavioural development, and academic achievement.

### *Adjustments*

In Table 2, within the cluster 'uneven development', the dimension 'factor and index IQs' was added, because intra-individual uneven development of these, might add essential needs-based information. PSI is mentioned separately, because it is one of the core character-

istics of Table 1. We added the cluster ‘academic achievement’, because our definition of IG included the dimension ‘academical performances’ and because scholastic results are essential to psycho-educational NBA. Moreover, the general dimensions Executive Functions (EF) and Central Coherence (CC) were added in the clusters ‘EF issues’ and ‘memory issues’, since current research shows these to be crucial in cognitive theories and assessments of ASDs (e.g. Assouline et al., 2009; Baron-Cohen, Ashwin, Ashwin, Tavassoli & Chakrabarti, 2009; Happé & Vital, 2008; Teunisse, 2009).<sup>8</sup> In the lower part of Table 2, the differential S&W profile, some texts in the cells are descriptions out of the DD-Checklist. Some of these texts had to be reformulated or replaced to fit the textual and situational context of Table 2, or because of new conceptual insights. In the row of “social issues” for example, the texts in the third and fourth column of the “grey zone” were originally defined together as a manifestation of giftedness by Burger-Veltmeijer (2006b, 2007, 2008). Since “social isolation” could not be called a Strength however, we could not put this text in the first column of the grey zone. Based on the idea of Assouline et al (2009), who perceived two types of gifted students with social difficulties, we divided the text between the “mild” and the “moderate” areas, that is the third and fourth column of the grey zone in Table 2. Furthermore, two clarifying texts of Neihart (2000) and Cash (1999) were added in the rows of “verbal/language issues” and “EF issues”.

### *Categorical assessment*

Assouline et al. (2009), Doobay (2012) and Huber (2007) stressed the importance of a comprehensive battery of (neuropsychological) tests and questionnaires, in order to avoid misdiagnoses and missed diagnoses of students with IG+ASD. Huber (2007) suggested a combination of instruments that assess cognitive profiles, academic skills, motor functioning, developmental history, ASD symptom presentation, adaptive functioning, and co-morbid psychopathology. Assouline et al. (2009) added neuropsychological instruments that measure attention and EFs. These test batteries actually combine the commonly used instruments that help to diagnose either IG or an ASD, but were not empirically grounded to specific features of the co-existing concept of IG+ASD. Therefore, the use of such comprehensive batteries

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*EF* is an umbrella term for different interrelated cognitive skills, like planning, verbal fluency, inhibition, cognitive flexibility and working memory. These mental control processes enable self-control in novel and ambiguous situations (Geurts, 2003). *CC* refers to deficits in conceptual processing, caused by the extreme focus on details and the concomitant incapability to overlook the whole picture. This brings about a fragmented way of cognitive and social information processing, so that individuals with weak *CC* poorly manage to see the forest from the trees (e.g. Happé, 1999).

might identify those students with rather obvious IG-characteristics and ASD-symptoms, but are not likely to solve the problem of biased diagnoses as caused by the similar characteristics and the camouflaging effect. To address to this problem, we assumed that it might be worthwhile to apply the idea of such comprehensive batteries, to the specific IG+ASD concepts, as mentioned in Table 1. Therefore, these basic theoretical concepts are the points of departure in the classification-directed assessment stage of the total *S&W Heuristic*, as is illustrated in the lower rectangle in Figure 1 and elaborated in Table 3. Contrary to the dimensional viewpoint of the S&W profile, the Yes/No profile (Table 3) has a categorical viewpoint. It can be filled in by means of the data in the (differential) S&W profile (see Table 2). Therefore, the entire S&W profile of an individual student has to be filled in before the Yes/No profile can be filled in by way of the questions in Table 3. Each question matches a characteristic out of Table 2. The upper part of Table 3 corresponds with the clusters ‘uneven development’, ‘academic achievement’ and ‘superior non-verbal capacities’ in the upper part of Table 2. The Yes/No questions in the upper part of Table 3 are addressed to detect whether or not there are any intra-individual developmental discrepancies that might be indicative for IG+ASD. The lower part of Table 3 corresponds with the clusters and characteristics in the lower part of Table 2, the ‘differential S&W profile’. Because of the differential nature of these *similarities*, the Yes/No questions in this lower part of Table 3 are addressed to the detection of any ‘ASD manifestations’ that is scores in column 8 of Table 2, the -2sd or severe impairment area. In case of an IG-student with (suspicion of) an ASD, the diagnostician can decide, on account of the amount of ‘Yes’ answers, whether or not there are enough indications to his/her opinion, to refer for a categorical procedure, or that further assessment will be needed before a decision like that can be made. In case of students who were already diagnosed as IG, ASD or IG+ASD, like in some second opinions, Table 3 might help to decide whether or not the label needs to be re-evaluated. Practical directions are noted in the next subsection.

### *Practical procedural directions*

In case of students with (suspicion of) IG+ASD, an S&W profile can be drawn either after a comprehensive assessment or, in case of second opinions, during the stage of dossier analysis. The *S&W Heuristic* does not prescribe particular tests, questionnaires and interviews, because these differ per region and nation. The diagnostician should select the locally used instruments that quantitatively and validly assess the dimensions in question. Moreover, qualitative information regarding adaptive, social and learning behaviours should be gathered,

not only in the testing room, but also in daily life situations, such as the classroom or during sports. The following procedure is suggested for diagnosticians:

- Based on all information, tick off the levels in the S&W area (Table 2, column 4-8). Sometimes, it will be possible to tick off in a quantitative way, by use of standard deviations (sd's) like in the Wechsler scales, or in some tests that measure Executive Functions (EFs)<sup>9</sup>. Sometimes a qualitative estimation is needed, based on observational data and clinical and educational professional experience.
- Determine whether the student is IG (see the definition in the subsection *Theoretical concepts* or the suggested operational definition in the subsection *Implications*).
- Then decide whether more data are needed to finish the profile, and subsequently collect these via anamneses, tests, observations and/or dossier analysis.
- Translate the S&Ws (column 9) into SPENs (column 10) per dimensional trait by means of questions such as: "What does the student need to develop this specific interest or strength?" or "what does the student need to stretch or compensate for this specific weakness or impairment?" Note the SPENs in column 10.
- Note records regarding actual provisions in school and at home in column 11.
- Determine per dimension whether there is a goodness of fit between the SPEN (column 10) and the actual environmental provisions (column 11), and note in column 12.
- Integrate all SPENs into intervention indications, to improve the goodness of fit (column 13), either per dimension, per cluster of dimensions, or in general, based on questions like: "What can we do to develop the contradictory Ss and Ws?", or "how can we use the Ss to improve or compensate for the Ws?", or "how can we prevent the Ws from hampering the development of Ss?" (see, for inspiration, e.g. Bianco et al., 2009; Lanou et al, 2012).
- Put the interventions into use in the next few weeks or months.
- Then fill in some aspects of the S&W profile again, based on (short) re-assessment and compare the new and the old profiles to evaluate the effect of the interventions: If there is any improvement (more or stronger Ss and/or a better goodness of fit, see Table 2), continue the interventional actions, or adjust them to the new situation.
- In case of no improvement or decline (more or stronger Ws and/or lesser goodness of fit in line with Table 2), determine whether or not referral for diagnosis is needed by filling in The Yes/No profile of Table 3.

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<sup>9</sup> See previous footnote

- Meanwhile, or after diagnosis, make new SPENs of the child, and actualise the goodness of fit, either in the regular curriculum or in special education, or in the home environment.
- Renew the S&W profile either about every two years, or when problems arise or increase.

## Discussion

### *Value of the S&W Heuristic*

The *S&W Heuristic* is meant to be an explorative point of departure in future empirical research, theory development and clinical and psycho-educational practical use, concerning identification and needs-based assessment of students with (suspicion of) IG+ASD. It might be of help in reducing the problem of biased assessments of students with (suspicion of) IG+ASD, by means of a systematic integration of dimensional and categorical assessment, that is primarily aimed at a dimensional NBA-procedure.

The first novelty and strength of the *S&W Heuristic* is that the comprehensive assessment departs from *IG+ASD characteristics*, instead of IG-characteristics apart from ASD-symptoms. The second novelty and strength is that it offers the opportunity of translations from many dimensional S&Ws into SPENs, in a *systematic* way. Despite some superficial similarities, the *S&W Heuristic* differs profoundly from the DD-Checklist (Burger-Veltmeijer, 2006b, 2007, 2008). This is because of the grounded assemblage of the three conceptual underpinnings and because of the adjustments as mentioned in one of the previous subsections. Moreover, the *S&W Heuristic* contains more dimensions and contrary to the DD-Checklist it is explicitly aimed at the identification of S&Ws and its relation to SPENs. Therefore, the *S&W Heuristic* has a surplus value in relation to the DD-Checklist.

The *S&W Heuristic* offers professionals in psycho-educational practice another way of thinking in individual assessments of students with (suspicion of) IG+ASD, as explained next: Today, labels serve as an admission ticket to special psycho-educational facilities and funding. We perceived that this might even lead to the conviction among professionals that a student without a label does not need any special, that is individually tuned, provisions. This is contrary to the contemporary dimensional viewpoint, which implicates the existence of a grey zone between normality and deviation. Moreover, deviation might even be an extreme form of normality (Baron-Cohen, 2000; Burger-Veltmeijer, 2006b, 2007; Happé, 1999; Lawson et al., 2004). This implies that ‘grey-zone’ students, such as underachievers or camouflaged stu-

dents or students with atypical S&Ws, might have rather equal SPENs for some dimensions as actual IG+ASD-labeled students, but do not receive appropriate services. The *S&W Heuristic* implies that a student need not necessarily be labelled as IG+ASD to be in need of special interventions.

Recapitulated, the *practical value* of the *S&W Heuristic* is that it offers professionals a systematic and ‘student centred’ way of thinking in individual assessments concerning (suspicion of) IG+ASD, since it does not assess whether or not the student fits the label IG+ASD, but rather which intervention-indications fit the student with (suspicion of) the label IG+ASD. So we can explicitly recommend the use of the *S&W Heuristic* to diagnosticians in clinical and psycho-educational organisations who are about to assess a student with any obvious or camouflaged characteristics of IG+ASD, because the *S&W Heuristic* can serve as an aid to reduce biased diagnoses and to stimulate a systematic translation of assessment data into SPENs. The *theoretical value* of the *S&W Heuristic* is that it addresses the necessity of research coordination in gifted research, as was suggested by Dai, Swanson and Cheng (2010), because of the integration of psychological constructs and educational practice that was often neglected in gifted research. In sum, the *S&W Heuristic* bridges the gap between clinical and psycho-educational research and praxis regarding students with (suspicion of) IG+ASD.

### *Limitations*

The *S&W Heuristic* addresses just one side of a NBA focus, because it provides no assessment directories concerning the NBA-stage of the goodness of fit with environmental provisions. We had to make a start, however, with an unexplored phenomenon. Identifying individual S&Ws, translating these into SPENs and eventually connecting these to intervention-indications, is the fundamental point of departure in defining the eventual ‘goodness of fit’ between the individual needs and the psycho-educational environmental conditions that are necessary to fulfil these needs. This connection between the S&Ws and the SPENs is the core-focus of our needs-based Heuristic. Subsequently, and beyond the scope of this study comes the assessment of the actual psycho-educational environmental provisions.

Since there is no grounded conceptualisation of the phenomenon IG+ASD until now, it could be better to start with extensive cluster analysis or cross-sectional studies with controls such as typically developing IG-students and/or average intelligent ASD-students, in order to develop conceptualisation of IG+ASD. It might take a lot of time, however, before

grounded validation of the phenomenon IG+ASD will eventually take place, and it does not provide solutions to actual practical assessment and interventions questions. Since our motivation partly stems from our work in clinical and educational practice, we think it is important to address both theory development as well as practical solutions. Future studies might use the methodology of design research, that aims to explore and solve practical problems (Nieveen et al., 2006) as well as to contribute to theoretical conceptualisation.

The *S&W Heuristic* might seem to claim that a profile-based approach will reduce bias inherent in recognizing ASD in IG students or vice versa. Bias, however, is likely at various stages of a NBA procedure: before, during and after the S&W Profile analysis. Bias may for instance be caused by the selection of dimensions used in the profile, or bias may be inherent in the instruments used. Therefore, the *S&W Heuristic* should not be seen as a wonderful remedy. We think, however, that bias could possibly be reduced by a profile-based approach, because it might prevent one-sided thinking at the very beginning of the assessment process, since it forces the diagnostician to include dimensions (and instruments) in a two-sided way. In doing so, the possibility of a systematic error, a ‘false start’, may be reduced. In addition, bias might occur if the diagnostician starts the process with an exclusive focus on IG+ASD. In that manner, other camouflaged co-existing areas of Ss or Ws could stay undetected. A profile based approach might have the potential of reducing such bias: If, for example, a student with suspicion of IG+ASD shows some symptoms of dyslexia as well, the diagnostician should add ‘dyslexia-dimensions’ to the S&W profile, such as Rapid Naming or Phonological Skills, in order to search for possible camouflaged Ws. In this way, we think that a profile based approach might eventually be applied to other categories of twice-exceptionality or comorbidity. This might be a challenge for future research.

Since the concepts in Tables 1, 2 and 3 are based on one systematic literature review, which was explorative in nature (Burger-Veltmeijer et al., 2011), in addition with the small amount of recently published empirical studies (Assouline et al., 2009; Doobay, 2010; Foley Nicpon et al., 2011b) it might seem rather speculative to use them as the basic assumptions in an NBA procedure. We think, however, that starting with the characteristics of Table 1 is legitimate because the Heuristic is an explorative point of departure in the future process of ongoing conceptual refinement and progressing practical experience, which implies ongoing evaluation. This article describes the first cycle in the prototyping stage in which the basic concepts, such as the characteristics and the dimensional viewpoint, are identified and assem-

bled. Future developmental research has to imply the analysing and modification stages of the design, and the evaluative and reflectional stages, in which the effectiveness of the design can be studied. In other words, verification of the Heuristic and its merits for the conceptualisation of IG+ASD will take place in a different way and at a different stage than usually provided in validation studies (see also footnote 3).

Another limitation might be that the Heuristic requires observations in everyday situations, that offer relevant information regarding the patterns of social interactions and reciprocal communication, as well as patterns of adaptability and organisation of schoolwork. Daily life observations take time, however, and might be expensive and can hardly be quantitatively noted. Alternatively, one could restrict observations to the test-situation by using the Autism Diagnostic Observation Schedule, ADOS (Lord, Rutter, Dilavore & Risi, 2009), as was done by Assouline et al. (2009) and Doobay (2011). To our clinical experience, the ADOS offers the opportunity of relevant data, which do not only ground an ASD classification, but subsequently can also be used in a needs-based way. On the other hand, the ADOS was developed to differentiate between Autistic Disorder, PDD-NOS or non-spectrum diagnoses (Lord et al., 2000), and we noticed that the detection of highly verbal students with IG+ASD might be difficult with this instrument. Moreover, some camouflaging IG students might compensate for their ASD-symptoms in structured one-to-one person test situations, because of their strong cognitive analytical understanding and learned communication tactics. Therefore, we explicitly recommend observations in everyday situations. This is the more valid, as the NBA procedure is not primarily aimed at classification, but at SPENs. Future research could compare the ADOS with observations in everyday situations and determine the possibility of supplementary values of either one within the *S&W Heuristic*.

Last but not least, one could argue that a dimensional procedure, aimed at SPENs, might hinder to consider a unified way to think clearly about interventions of students with (suspicion of) IG+ASD. We suggest, however, that researchers and practitioners should not (only) try to discern interventions in general. They could, instead, focus on a unified way of thinking about *heuristics* that help professionals to integrate the conflicting needs and contradictory intervention-indications resulting from the discrepancies between Ss and Ws of individual TE students. The *S&W Heuristic* might provide an onset.

### *Implications*

Foley Nicpon et al. (2011a) stressed the necessity of future investigation of diagnostic and intervention questions concerning TE students, including IG+ASD students. They recommended investigating among various types of giftedness, with sound and replicable methodology, consistent definitions and sample standardisation. Moreover, they mentioned the need to verify the existence of the camouflaging effect. The *S&W Heuristic* has these potentials and might serve as a point of departure for future studies, because of the following: Various types of gifted students, as well as the actual designs of assessments in clinical and psycho-educational practice could be systematically identified by studying S&W profiles among large groups of IG students with and without co-existing exceptionalities, like ASD traits. For example by way of broad-based dossier studies and interviews with professionals. This might shed light on possible subgroups of IG-students or the relation between emotionally caused versus neurobiologically caused underachievement (Burger-Veltmeijer, 2008), or maybe even camouflaged IG and/or ASD characteristics.

We recommend that the definition of IG should be operationalised as follows: The Full Scale Intelligence Score (FSIQ) should be 130 or above, in order to clearly differentiate IG+ASD from the general phenomenon ‘high-functioning autism’ that is sometimes shared under IG but implies IQs of at least 80. Furthermore, in case of Wechsler scales, this FSIQ of 130 should only be applied to a combination of verbal and nonverbal intelligence scores, because factor scores and index scores, like SPI, might be relatively low among IG+ASD students (Assouline et al., 2009; Doobay, 2011; Huber, 2007). The camouflaging effect however, could possibly only be studied if IQ criteria are not restricted to 130. For instance by surveying large groups of professionals and profiling the S&Ws of those students they think might be camouflaging. Or, one could apply the 95% confidence interval to FSIQs of at least 130, which will provide considerable stretch.

Last but not least, research on the *S&W Heuristic* should be applied to dossiers, professionals or students in clinical as well as psycho-educational organisations, in order to study possible one-sidedness and biased assessment and intervention-indications.

### **Status of the S&W Heuristic**

A lot of work is still to be done to study the twice-exceptionality IG+ASD. The *S&W Heuristic* might provide systematics and therefore had to be theorised in an elaborate and

grounded way in this contribution. The various parts in the *S&W Heuristic* can be modified in future according to new empirical insights. Moreover, researchers and practitioners might explore variations of the *S&W Heuristic*, for instance by way of a systematic use of supplementary dimensional concepts. In this way, it serves as a frame of reference that provides some coherence and new directions for research and clinical and psycho-educational practical use, and might eventually be applied to other categories of twice-exceptionality as well. Therefore, the *S&W Heuristic* is systematic and dynamic in nature.

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